

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
11 December 2003 (11.12.2003)

PCT

(10) International Publication Number  
**WO 03/101779 A2**

(51) International Patent Classification<sup>7</sup>: B60Q

(21) International Application Number: PCT/US03/16667

(22) International Filing Date: 28 May 2003 (28.05.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/385,240 31 May 2002 (31.05.2002) US

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,  
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US,  
UZ, VN, YU, ZA, ZM, ZW.

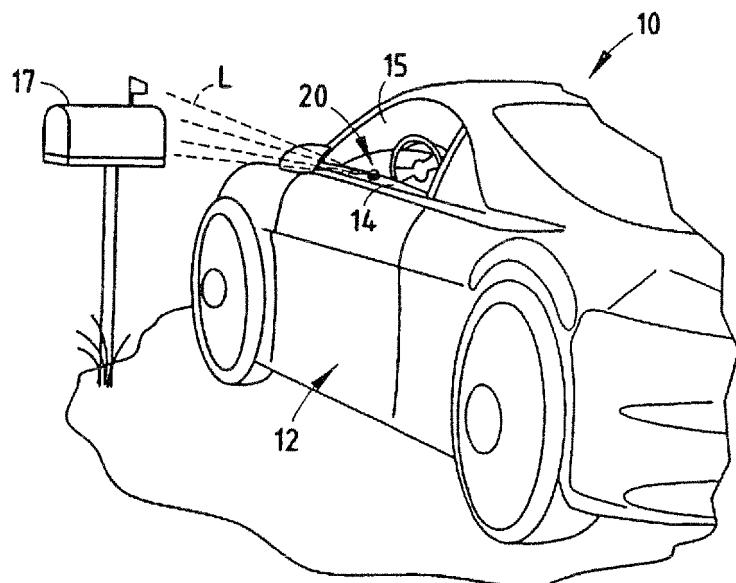
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- without international search report and to be republished upon receipt of that report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: VEHICLE AUXILIARY LIGHT



(57) **Abstract:** An auxiliary light can be retracted when not in use and extended and illuminated to provide auxiliary lighting for a vehicle. In a preferred embodiment, the auxiliary light is rotatable for directing illumination through an arc of approximately 180°. In one embodiment, the auxiliary light is mounted to an upper edge of the driver's door and can be extended and rotated for providing illumination outwardly from the vehicle or to the interior of the vehicle. A push-push latch is employed to extend and retract the auxiliary light which includes electrical contacts forming a switch and contact ring allowing power to be supplied to the light source contained therein when the auxiliary light is extended and rotated for use. A bright white LED may be employed as the illumination source.

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## VEHICLE AUXILIARY LIGHT

### BACKGROUND OF THE INVENTION

The present invention relates to a vehicle auxiliary light and one which can be retracted for storage and extended for use.

There exists a wide variety of vehicle interior lights, including map reading lights which may be built into visors, overhead consoles or in the headliner of the vehicle. Such lights direct illumination into the vehicle interior but typically have a limited amount of directability for providing auxiliary lighting under low ambient light conditions. Frequently, it is desirable to have light directed to an area of the interior of the vehicle which is not illuminated by such existing lighting systems.

Further, on occasion it may be desirable to provide illumination outside the vehicle, such as, for example, when looking at night for addresses on mailboxes or for opening and retrieving mail from one's own mailbox. For such purpose, a vehicle operator must typically either rely upon the headlights of the vehicle or utilize a flashlight or other portable lighting device to provide illumination laterally and externally of the vehicle.

It would be desirable to provide a lighting system which is incorporated within the vehicle and which would provide a greater degree of directability for interior lighting of the vehicle and also provide exterior lighting for the vehicle operator without the need for separate portable lighting.

### SUMMARY OF THE INVENTION

The system of the present invention provides such a feature and provides an auxiliary light which can be retracted when not in use or extended and activated to provide auxiliary lighting for the vehicle. In a preferred embodiment of the invention, the auxiliary light is rotatable for directing illumination through an arc of approximately 180°. In one preferred embodiment of the invention, the auxiliary light is mounted to an upper edge of the driver's door and can be extended and rotated for providing illumination outwardly from the vehicle or to the interior of the vehicle.

In one embodiment of the invention, a push-push latch is employed to extend and retract the auxiliary light which includes electrical contacts forming a switch and contact

ring allowing power to be supplied to the light source contained therein when the auxiliary light is extended for use. In another preferred embodiment of the invention, a bright white LED is employed as the illumination source to provide a long lasting low power light source.

These and other features, objects and advantages of the present invention will become apparent upon reading the following description thereof together with reference to the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a fragmentary perspective view of a vehicle employing the auxiliary light of one embodiment of the present invention, shown mounted on the vehicle door in a position for directing light outwardly therefrom;

Fig. 2 is a fragmentary perspective view of the vehicle interior, showing the auxiliary light of the present invention in a position for directing illumination toward the interior of the vehicle;

Fig. 3 is an enlarged fragmentary perspective view of the auxiliary light of the present invention, shown in a retracted, non-use position;

Fig. 4 is an enlarged fragmentary perspective view of the auxiliary light shown in Fig. 3, shown in an extended use position;

Fig. 5 is an exploded perspective view of the auxiliary light assembly;

Fig. 6 is an enlarged perspective view of the assembled light assembly shown in Fig. 5, shown in an extended position;

Fig. 7 is an enlarged perspective view of the light assembly shown in a retracted position;

Fig. 8 is an enlarged fragmentary perspective view of the spring-controlled retraction and extension mechanism employed for holding the auxiliary light assembly in either an extended or retracted position; and

Fig. 9 is an electrical circuit diagram of a retractable light assembly employing an LED light source.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to Figs. 1 and 2, there is shown a vehicle 10, such as an automobile, sports utility vehicle, van, truck or the like, with an automobile shown in these specific figures. The vehicle includes a driver side door 12 including an upper edge 14 adjacent the driver's side window 15. Mounted within the top 14 of door 12 on the inside of window 15 is an auxiliary light assembly 20 of the present invention which, as seen in Figs. 3-5, includes a movable housing comprising a rotatable dome assembly 30 and a lower fixed housing 40. The dome assembly 30 can be retracted, as shown in Figs. 3 and 7, when not in use or extended, as shown in Figs. 1, 2, 4, and 6, for use. Further, the dome 30 can be rotated, as illustrated in Figs. 1 and 2, through an arc of at least about 180° to direct light rays L outwardly from the vehicle toward, for example, a mailbox 17 (Fig. 1) or inwardly, as illustrated in Fig. 2, toward the interior of the vehicle. The retractable, rotatable light assembly 20 can likewise be mounted to any interior component of the vehicle, such as, for example, on a floor console, at a suitable position on the instrument panel, in the rear seat area, or the like, for directing illumination through a relatively wide arc to different areas of only the interior of the vehicle.

Light assembly 20 can be extended and retracted in the direction indicated by arrow A in Fig. 3, which also serves, as described below, to activate an integral switch for applying operating power to a light source contained therein and rotated, as illustrated by arrow B in Fig. 4, through an arc of at least about 180° for directing illumination either to various locations with the interior of the vehicle or between the interior and exterior of the vehicle as shown in the embodiment of Figs. 1 and 2. One embodiment of the light assembly 20 is now described in connection with Fig. 5.

In Fig. 5, the exploded view of the light assembly illustrates the rotatable dome 30 which includes a hemispherical top 31, a generally cylindrical side wall 32 having a window 33 which can receive a transparent lens 34. Mounted within the dome 30 is a lamp 35 within a lamp socket 36 integrally including separate electrical contacts 37 and 38. Socket 36 is mounted within the interior of the dome 30 to position lamp 35 in alignment with lens 34. In the embodiment shown in Fig. 5, lamp 35 is a small cartridge type bulb but in other embodiments, as illustrated in Fig. 9, a bright white

LED is employed. In such embodiments, socket 36 is modified for receiving such an LED.

The dome assembly 30 also includes an annular recess 39 for slidably receiving an arcuate cam 41 therein including a recessed racetrack pattern 42 for defining a push-push latch in connection with a spring arm 43 coupled to lower cylindrical housing 40. A compression spring 50 extends between an annular ridge 51 spaced above the lower edge of dome 30 and the floor 44 of lower housing 40 to provide a bias force tending to urge dome assembly 30 upwardly to an operative position when top 31 of dome 30 is depressed to release the latch. The latch defined by elements 42 and 43 is a conventional push-push latch utilized in numerous vehicle accessories in connection with a spring, such as spring 50, for holding a member, such as dome assembly 30 in a retracted position or an extended position, as illustrated in Figs. 3 and 4. Element 43 has a tip 43' which extends within the heart-shaped track 42 of the latch cam member 41 through an aperture 45 in the cylindrical side wall 46 of lower housing 40. It is captively held in a U-shaped boss 47 and resiliently allowed to move in a radial direction by means of a locking, C-shaped clip 48 which extends around the cylindrical periphery of housing 40, as best seen in Fig. 8, to hold tip 43' of arm element 43 within the track 42, as best seen in Fig. 8. A pair of arcuate fixed electrical contacts 52 and 54 are insert-molded within housing 40 and extend through openings 56 and 58, respectively, in the side wall 46 of the cylindrical housing 40 to engage ring contacts 37 and 38, respectively, of socket 36 when the dome 30 is extended to the position shown in Fig. 4.

Thus, arcuate contacts 52 and 54 are positioned near the top of housing 40 such that they engage contacts 37 and 38 only when the dome 30 is extended to a use position, as shown in Fig. 4, at which time electrical contact is made between the contacts 52 and 54 coupled, as seen in Fig. 9, to a source of operating power from the vehicle to supply operating power to the lamp 35. Thus, the contacts 37, 38 and 52, 54 define an electrical switch in conjunction with the latch assembly. The arcuate contacts 37, 38 each include a radially outwardly extending contact 53 which engages the inner curved surface of contacts 52 or 54 to provide the electrical connection between the fixed and movable contacts. As dome 30 is rotated (arrow B, Fig. 4), contact 53 remains in electrical contact with its associated contact 52 or 54 to continuously apply power to lamp 35 when assembly 20 is in an extended use position.

Lamp assembly 20, when assembled as seen in Figs. 6 and 7, can be fixedly mounted to a mounting bezel 60 (Figs. 3 and 4) on the edge 14 of the vehicle door, in one embodiment, or another shaped bezel for mounting within the vehicle interior at different locations with the bezel providing an interface between the vehicle interior component and the light assembly 20. A suitable fixed coupling anchors housing 40 to bezel 60.

In operation, the vehicle occupant depresses the upper domed surface 31 of light assembly 20 in a downward direction, as seen in Fig. 3, which causes tip 43' of latch arm 43 to release from the upper tip of the heart-shaped racetrack 42 allowing spring 50 to urge dome 30 upwardly, at which time extension 53 of contacts 52 and 54 engage semicircular contacts 37 and 38, thereby providing operating power to lamp 35. The tip 43' of arm 43 captively engages the lower edge 42' of track 42, holding the dome assembly 30 in the fully extended position, as illustrated in Fig. 4. The arcuate contacts 52 and 54 allow the rotation of dome 30 while maintaining continuous electrical contact for power supplied to lamp 35. The dome 30 can be rotated with respect to lower housing 40 with arcuate cam member 41 riding within the arcuate slot 39 in the dome, thereby maintaining the latching function throughout the range of motion of light assembly 20, as illustrated by arrows B in Fig. 4. Typically, the arcuate adjustment will be approximately 180°, although a greater or lesser amount of rotation can be supplied by changing the arcuate length of recess 39 the width of track member 41 and by supplying suitable slip-ring type contacts for supplying operating power to the light source, such as cartridge lamp 35.

In a more preferred embodiment of the invention as illustrated in Fig. 9, in place of a cartridge lamp 35, a bright white LED 70 is coupled to a suitable socket 36', which also includes ring contacts 37 and 38 which selectively engage contacts 52 and 54 coupled by contacts 52' and 54' extending downwardly from housing 40 and which are coupled to the vehicle power source, such as battery 55. The same construction of upper and lower housings 30, 40 and latch assembly 47 is employed with the only difference between the use of lamp 35 and LED 70 is the specific LED or lamp receiving socket configuration. Dome 30 is of sufficient size to provide a convenient push-button actuator for use by the vehicle operator and can be molded of a suitable polymeric material, such as polycarbonate, with the dome being opaque and lens 34

transparent and formed to provide the desired focusing of light. The interior of dome 30 may be plated with a reflective surface to increase the efficiency of light projected therefrom. Housing 40 likewise can be integrally molded of a suitable polymeric material, such as polycarbonate, with the cylindrical opening 45 of housing 40 selected to allow the axial and radial motion of dome 30 within housing 40 to accommodate the push-push movement of dome 30 and its rotation for directing light through lens 34. When in a retracted position, as illustrated in Figs. 3 and 7, the auxiliary light assembly of the present invention provides a substantially unobtrusive vehicle accessory to conform to the aesthetic appearance of the vehicle interior. When extended, as shown in Figs. 1, 2, 4, and 6, the lamp assembly provides an effective, directable source of illumination to not only illuminate various areas of the interior of a vehicle but, when mounted to the edge of the door, as illustrated in Figs. 1 and 2, can be used for illuminating areas exterior to the vehicle.

It will become apparent to those skilled in the art that various modifications to the preferred embodiments of the invention as described herein can be made without departing from the spirit or scope of the invention as defined by the appended claims.

The invention claimed is:

1. An auxiliary light assembly for a vehicle comprising:  
a housing adapted to be mounted within a vehicle; and  
a dome having a light source and a window in said dome permitting light to project outwardly from said dome, said dome movable between retracted and extended positions with respect to said housing.
2. The assembly as defined in claim 1 wherein said dome is rotatably mounted to said housing.
3. The assembly as defined in claim 2 wherein said window includes a lens for directing light from said light source.
4. The assembly as defined in claim 3 wherein said housing and dome include a push-push latch extending therebetween for holding said dome in one of a retracted or extended position.
5. The assembly as defined in claim 4 wherein said assembly includes a compression spring extending between said dome and said housing for urging said dome toward an extended position.
6. The assembly as defined in claim 5 and further including slip rings and associated wiper contacts which align and engage when said dome is extended for coupling electrical power to said light source.
7. The assembly as defined in claim 6 wherein said light source comprises a white LED.
8. An auxiliary light assembly for a vehicle door comprising:  
a fixed housing for mounting within an upper edge of a door of a vehicle; and

a movable housing coupled to said fixed housing and movable between a retracted and an extended position, said assembly including a push-push latch for holding said movable housing in one of said retracted or extended positions, said movable housing including a light source and wherein said movable housing is rotatably mounted to said fixed housing for permitting light to be projected outwardly or inwardly of the vehicle from said movable housing.

9. The assembly as defined in claim 8 wherein said movable housing includes a lens for directing light from said light source.

10. The assembly as defined in claim 9 wherein said assembly includes a slip ring and wiper contacts defining a switch for coupling electrical power to said light source when said movable housing is extended.

11. The assembly as defined in claim 10 wherein said light source comprises a white LED.

12. An auxiliary light assembly for a vehicle door comprising:  
a fixed generally cylindrical housing adapted to be mounted within the top edge of a door of a vehicle; and  
a movable cylindrical housing having a light source to project light outwardly therefrom, said movable housing coupled to said fixed housing for movement between retracted and extended positions.

13. The assembly as defined in claim 12 wherein said movable housing is rotatably mounted to said fixed housing.

14. The assembly as defined in claim 13 wherein said movable housing includes a lens for directing light from said light source.

15. The assembly as defined in claim 14 and further including a push-push latch for holding said movable housing in one of a retracted or extended position.

16. The assembly as defined in claim 15 wherein said assembly includes a compression spring for urging said movable housing toward an extended position.
17. The assembly as defined in claim 16 wherein said assembly includes slip rings and associated wiper contacts for coupling electrical power to said light source.
18. The assembly as defined in claim 17 wherein said light source comprises a white LED.
19. An auxiliary light assembly for a vehicle comprising:
  - a fixed housing adapted to be mounted within a vehicle;
  - a movable housing movable between retracted and extended positions with respect to said fixed housing;
  - a light source positioned in said movable housing for permitting light to project outwardly from said movable housing; and
  - wherein said movable housing is rotatably mounted to said fixed housing.
20. The assembly as defined in claim 19 and further including a push-push latch for holding said movable housing in one of a retracted or extended position.
21. The assembly as defined in claim 20 wherein said push-push latch includes an arcuate member having a guide track and a follower arm extending in said guide track and wherein said movable housing includes an arcuate recess for slidably receiving said arcuate member.
22. The assembly as defined in claim 21 wherein said assembly includes slip rings and wiper contacts for coupling electrical power to said light source when said movable housing is extended.
23. The assembly as defined in claim 22 wherein said light source comprises a white LED.

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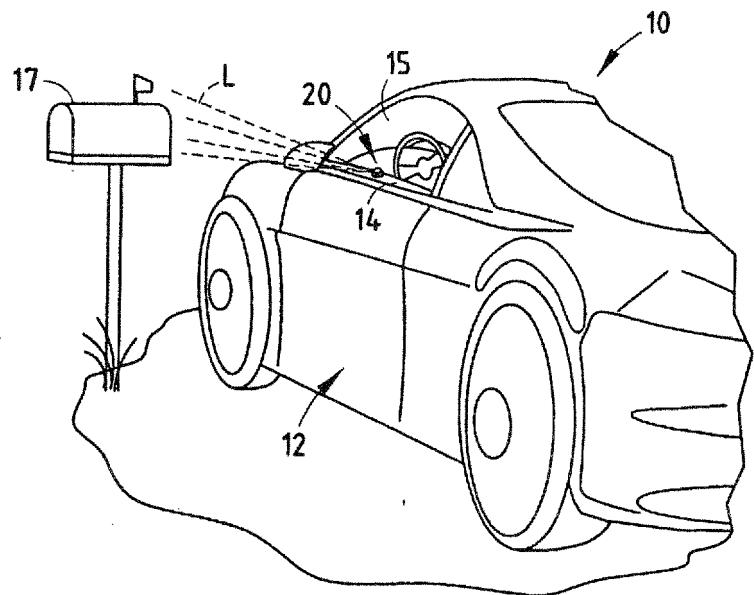


FIG. 1

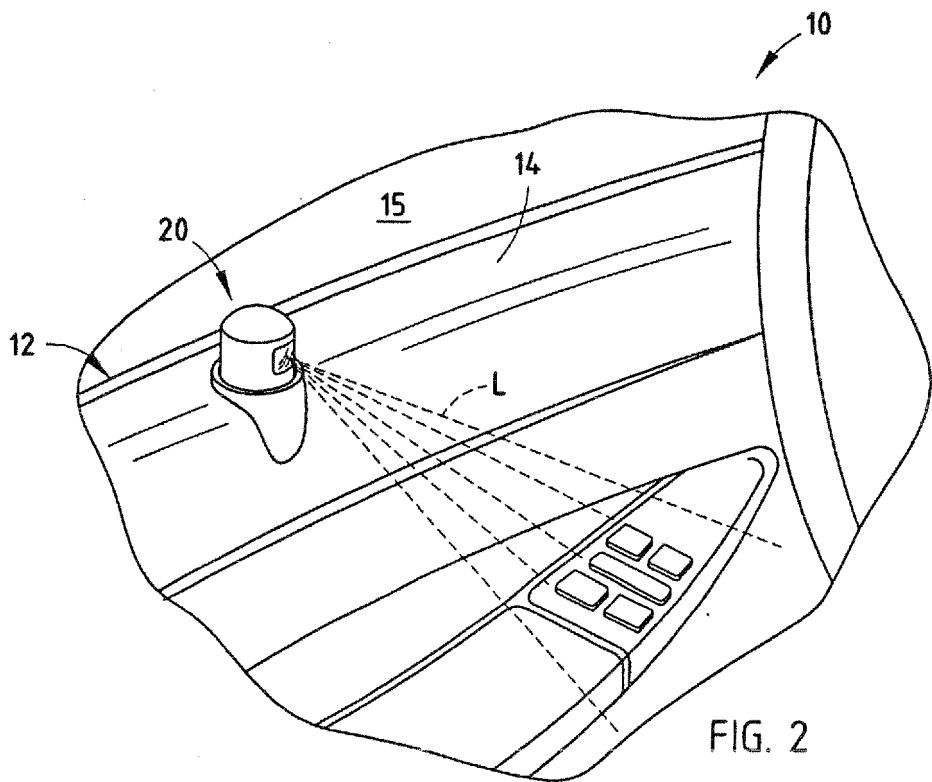


FIG. 2

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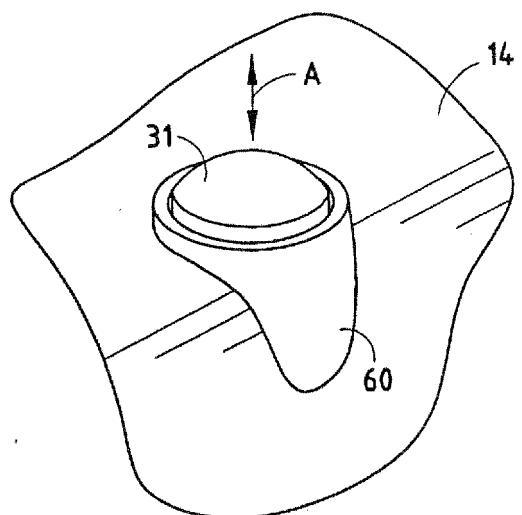


FIG. 3

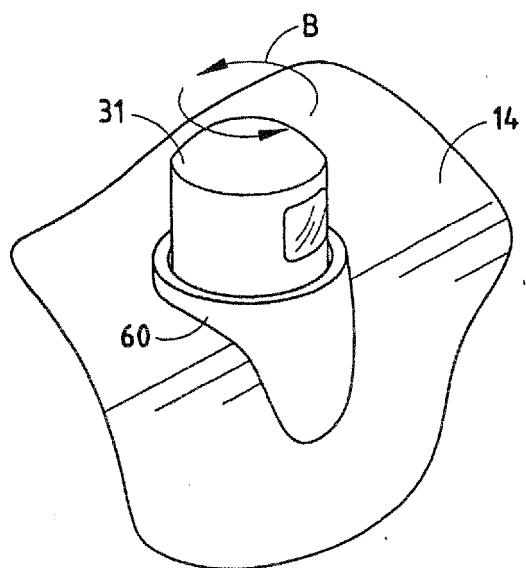


FIG. 4

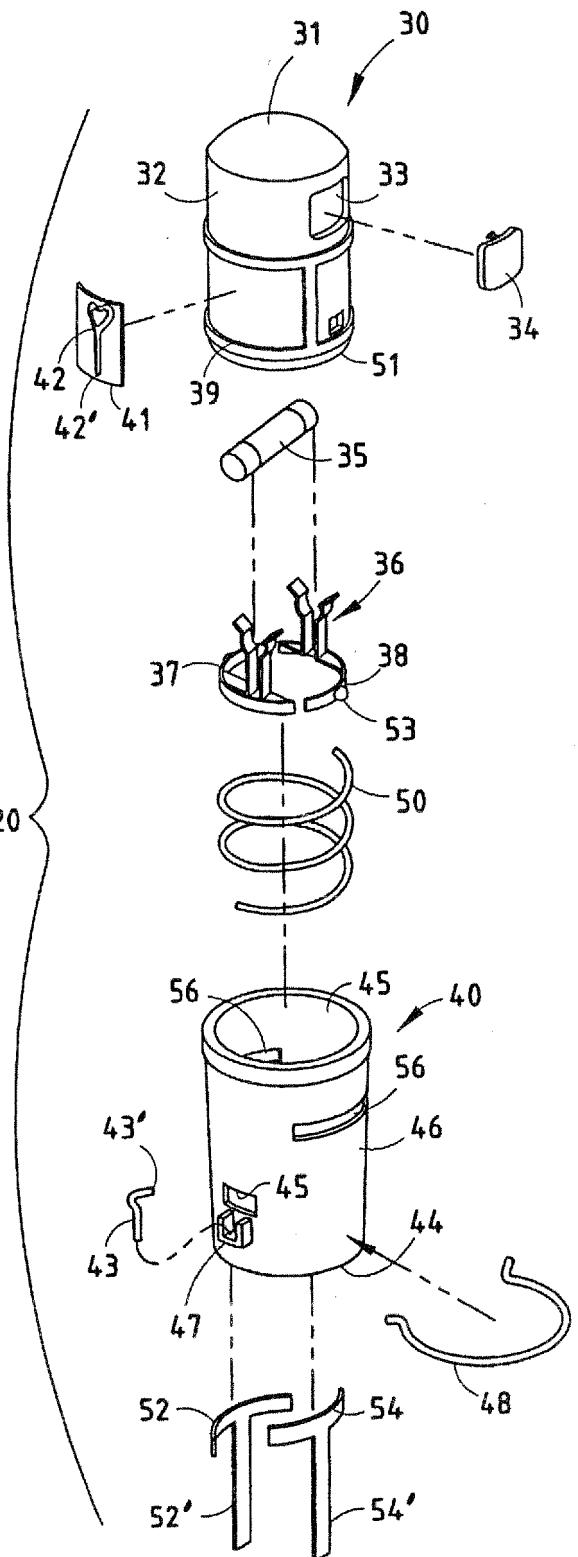


FIG. 5

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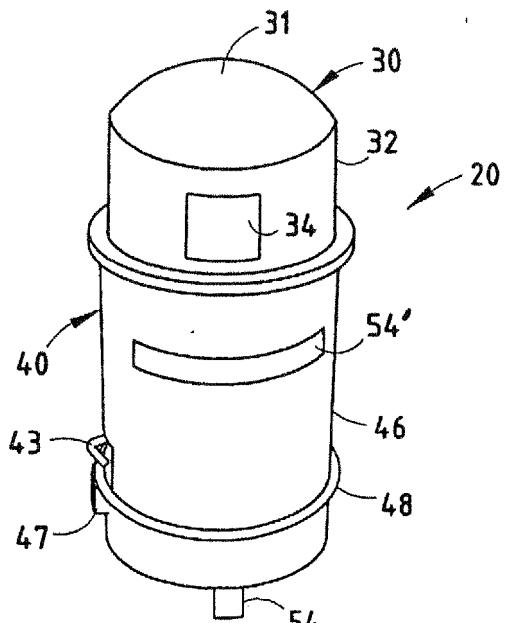


FIG. 6

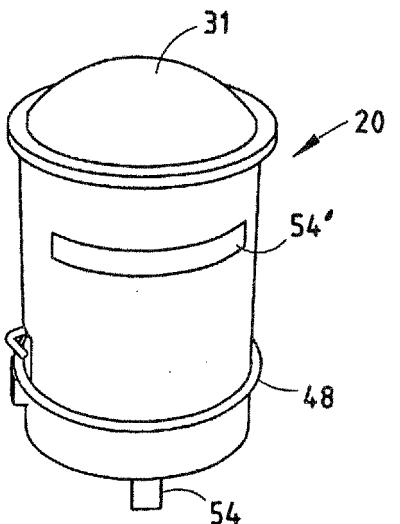


FIG. 7

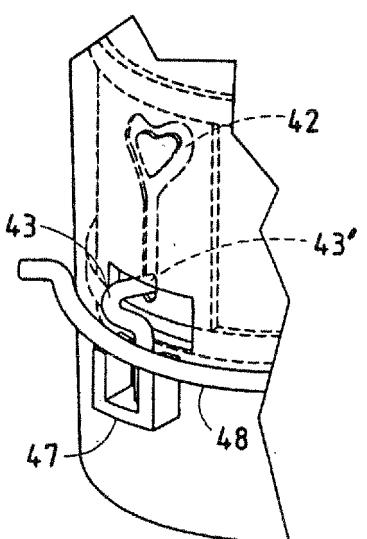


FIG. 8

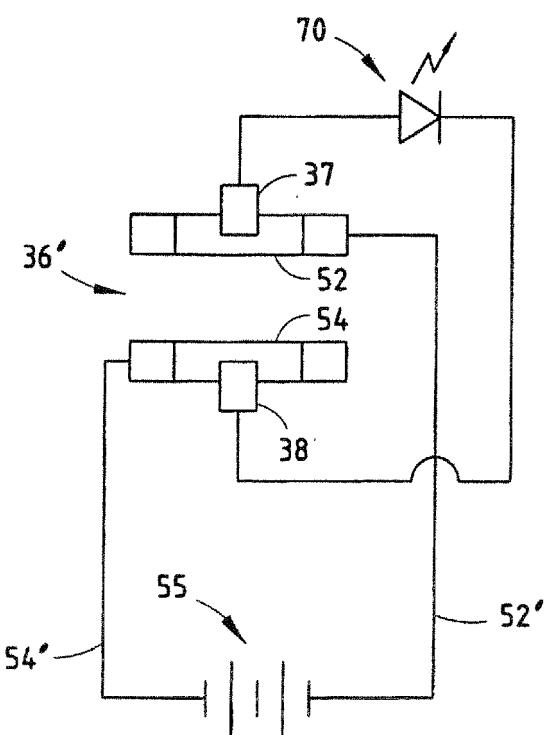


FIG. 9